Nemko Test Report:	5L0644RUS1
Applicant:	Wistron NeWeb Corporation No. 10-1, Li-hsin Road 1, Science-based Indus Taiwan, R. O. C.
Equipment Under Test:	**WLAN a+b+g mini-PCI Module** *Model:* ***CM9***
In Accordance With:	**FCC Part 15, Subpart E** UNII Band Transceiver And **FCC Part 15, Subpart C, 15.247** Digital Transmission System Transmitter
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, Texas 75057-3136
Authorized By:	David Light, Senior Wireless Engineer
Date:	21 December 2005

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Wistron NeWeb Corporation

Model No.: CM9

Name: WLAN a+b+g mini-PCI Module

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart E and C. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☐ New Submission ☒ Production Unit

☒ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Spurious Emissions (Restricted Bands)	15.407(a)	Complies
Spurious Emissions (Restricted Bands)	15.247(c)	Complies

Footnotes:

Only Spurious Emissions (Restricted Bands) was performed. EUT is test for a Class II Permissive change.

Section 2. Equipment Under Test (E.U.T.)

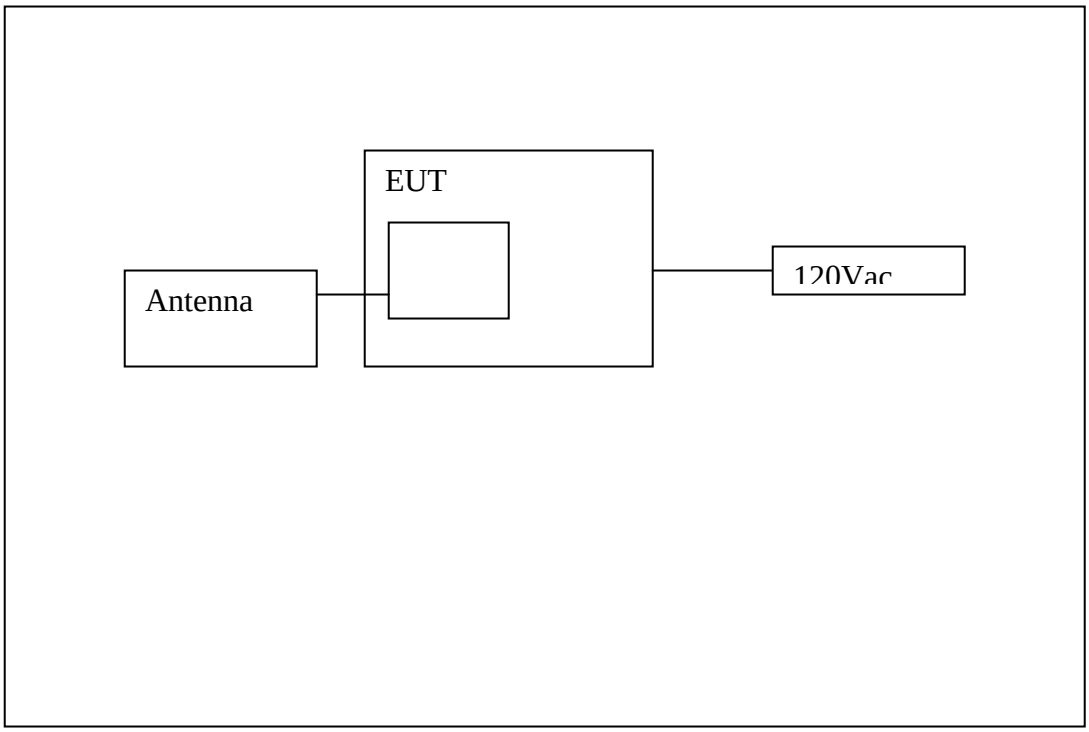
General Equipment Information

Frequency Band:	☒ 5180 – 5240 MHz ☒ 5260 – 5320 MHz ☒ 5725 to 5850 MHz
:	☒ 2412 to 2462MHz
Operating Frequencies:	5180 – 5240 MHz 5260 – 5320 MHz 5745, 5785, 5825 MHz 2412, 2442, 2462MHz Turbo Mode 5210, 5290,5760, 5800 MHz
Channel Spacing:	5 MHz
User Frequency Adjustment:	Software controlled

Description of EUT

WLAN a+b+g mini-PCI Module.

System Diagram



Section 3. Spurious Emissions (radiated)

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.407/15.247
TESTED BY: Kevin Rose	DATE: December 20, 2005

Test Results: Complies.

Measurement Data: Statement:
This transmitter was tested in 802.11a,b, and g mode and at 2412-2462,5180,-5240, 5260-5320, and 5745- 5805 MHz specification limit. A high-pass filter was used to reject the fundamental transmission for the test of the harmonics. . On Bandedge the HPF was removed.

Test Equipment: 1464-1484-1485-1016-1304-760-759-791-1471

EUT was searched from 30MHz to 40GHz

Average measurements are made with 1MHz RBW 10 Hz VBW The EUT was transmitting greater then 99% on time.

Reference: Data sheets below

1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

2412, 2442, 2462MHz were tested

AM2407	11b 2.4 GHz	Mag. Mount	7 dBi

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	4883.750M	44.5	+1.0	+3.3 +33.4	+32.6	49.6	54.0	-4.4	Vert
2	7325.750M	42.2	+1.2	+4.0 +35.8	+32.3	50.9	54.0	-3.1	Vert
3	4823.750M	43.7	+1.0	+3.2 +33.2	+32.5	48.6	54.0	-5.4	Vert
4	7235.750M	42.3	+1.2	+3.9 +35.8	+32.2	51.0	54.0	-3.0	Vert
5	4923.750M	44.8	+1.0	+3.3 +33.5	+32.6	50.0	54.0	-4.0	Vert
6	7387.000M	42.5	+1.2	+4.0 +35.9	+32.4	51.2	54.0	-2.8	Vert
7	2483.500M	63.2	+0.8	+2.3 +29.0	+22.8	72.5	74.0	-1.5	Vert
8	2483.500M Ave	42.5	+0.8	+2.3 +29.0	+22.8	51.8	54.0	-2.2	Vert
9	2485.000M	54.3	+0.8	+2.3 +29.0	+22.8	63.6	74.0	-10.4	Horiz
10	2484.250M Ave	38.2	+0.8	+2.3 +29.0	+22.8	47.5	54.0	-6.5	Horiz
11	4924.750M	43.5	+1.0	+3.3 +33.5	+32.6	48.7	54.0	-5.3	Horiz
12	7386.750M	42.8	+1.2	+4.0 +35.9	+32.4	51.5	54.0	-2.5	Horiz
13	4884.750M	43.7	+1.0	+3.3 +33.4	+32.6	48.8	54.0	-5.2	Horiz
14	7326.750M	40.0	+1.2	+4.0 +35.8	+32.3	48.7	54.0	-5.3	Horiz
15	4824.750M	41.7	+1.0	+3.2 +33.2	+32.5	46.6	54.0	-7.4	Horiz
16	7236.750M	42.9	+1.2	+3.9 +35.8	+32.2	51.6	54.0	-2.4	Horiz

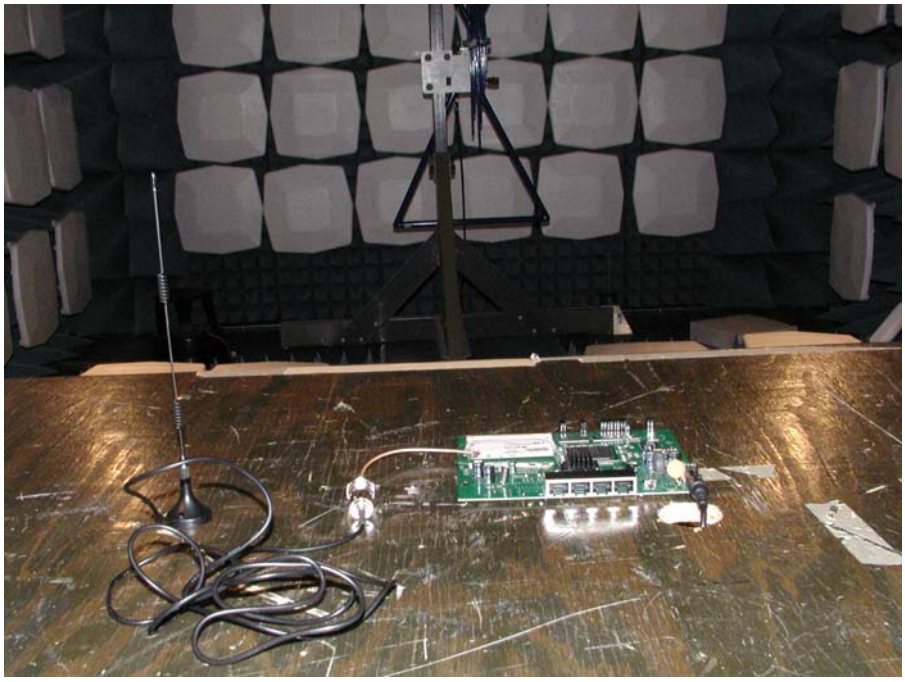
1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

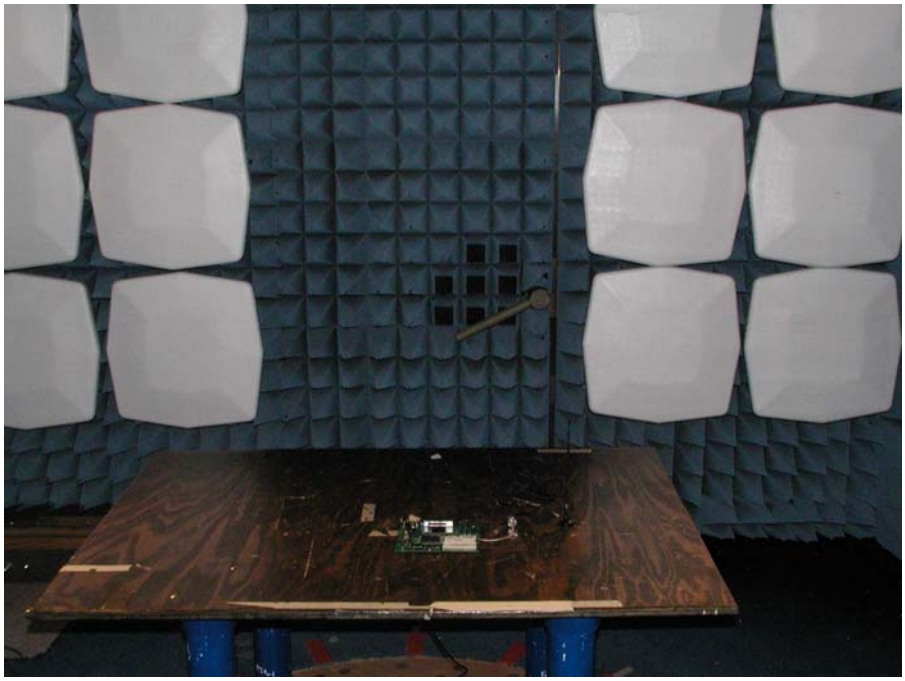
AM2407	11g 2.4 GHz	Mag. Mount	7 dBi

2412, 2442, 2462MHz were tested

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	4883.750M	43.7	+1.0	+3.3 +33.4	+32.6	48.8	54.0	-5.2	Vert
2	7325.750M	42.3	+1.2	+4.0 +35.8	+32.3	51.0	54.0	-3.0	Vert
3	4823.750M	44.3	+1.0	+3.2 +33.2	+32.5	49.2	54.0	-4.8	Vert
4	7235.750M	42.2	+1.2	+3.9 +35.8	+32.2	50.9	54.0	-3.1	Vert
5	4923.750M	44.1	+1.0	+3.3 +33.5	+32.6	49.3	54.0	-4.7	Vert
6	7387.000M	42.3	+1.2	+4.0 +35.9	+32.4	51.0	54.0	-3.0	Vert
7	2483.500M	61.2	+0.8	+2.3 +29.0	+22.8	70.5	74.0	-3.5	Vert
8	2483.500M Ave	41.5	+0.8	+2.3 +29.0	+22.8	50.8	54.0	-3.2	Vert
9	2485.000M	47.3	+0.8	+2.3 +29.0	+22.8	56.6	74.0	-17.4	Horiz
10	2484.250M Ave	33.0	+0.8	+2.3 +29.0	+22.8	42.3	54.0	-11.7	Horiz
11	4924.750M	42.3	+1.0	+3.3 +33.5	+32.6	47.5	54.0	-6.5	Horiz
12	7386.750M	42.7	+1.2	+4.0 +35.9	+32.4	51.4	54.0	-2.6	Horiz
13	4884.750M	44.3	+1.0	+3.3 +33.4	+32.6	49.4	54.0	-4.6	Horiz
14	7326.750M	42.2	+1.2	+4.0 +35.8	+32.3	50.9	54.0	-3.1	Horiz
15	4824.750M	43.2	+1.0	+3.2 +33.2	+32.5	48.1	54.0	-5.9	Horiz
16	7236.750M	42.0	+1.2	+3.9 +35.8	+32.2	50.7	54.0	-3.3	Horiz

Test setup Photos





5180 – 5240 MHz were tested
1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

SF-D53N	5.1GHz	Omni	5.5 dBi

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5150.000M	51.5	+1.1	+3.4 +33.7	+32.2	57.5	74.0	-16.5	Vert
2	5150.000M Ave	34.5	+1.1	+3.4 +33.7	+32.2	40.5	54.0	-13.5	Vert
15	5150.000M	42.3	+1.1	+3.4 +33.7	+32.2	48.3	54.0	-5.7	Horiz

NO Harmonics were detected within 20db of the limit

Turbo Mode 5210, 5290,5760, 5800 MHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5150.000M	37.2	+1.1	+3.4 +33.7	+32.2	43.2	54.0	-10.8	Vert
2	5150.000M	36.8	+1.1	+3.4 +33.7	+32.2	42.8	54.0	-11.2	Horiz
3	5350.000M	36.3	+1.1	+3.4 +33.7	+32.0	42.5	54.0	-11.5	Horiz
4	5350.000M	37.9	+1.1	+3.4 +33.7	+32.0	44.1	54.0	-9.9	Vert

NO Harmonics were detected within 20db of the limit

5260 – 5320 MHz

SF-D53N	5.3 GHz	Omni	5.5 dBi

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5350.000M	42.2	+1.1	+3.4 +33.7	+32.0	48.4	54.0	-5.6	Horiz
2	5350.000M	52.0	+1.1	+3.4 +33.7	+32.0	58.2	74.0	-15.8	Vert
3	5350.000M Ave	33.0	+1.1	+3.4 +33.7	+32.0	39.2	54.0	-14.8	Vert

No Harmonics were detected within 20db of the limit

1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

5745, 5785, 5805 MHz were tested

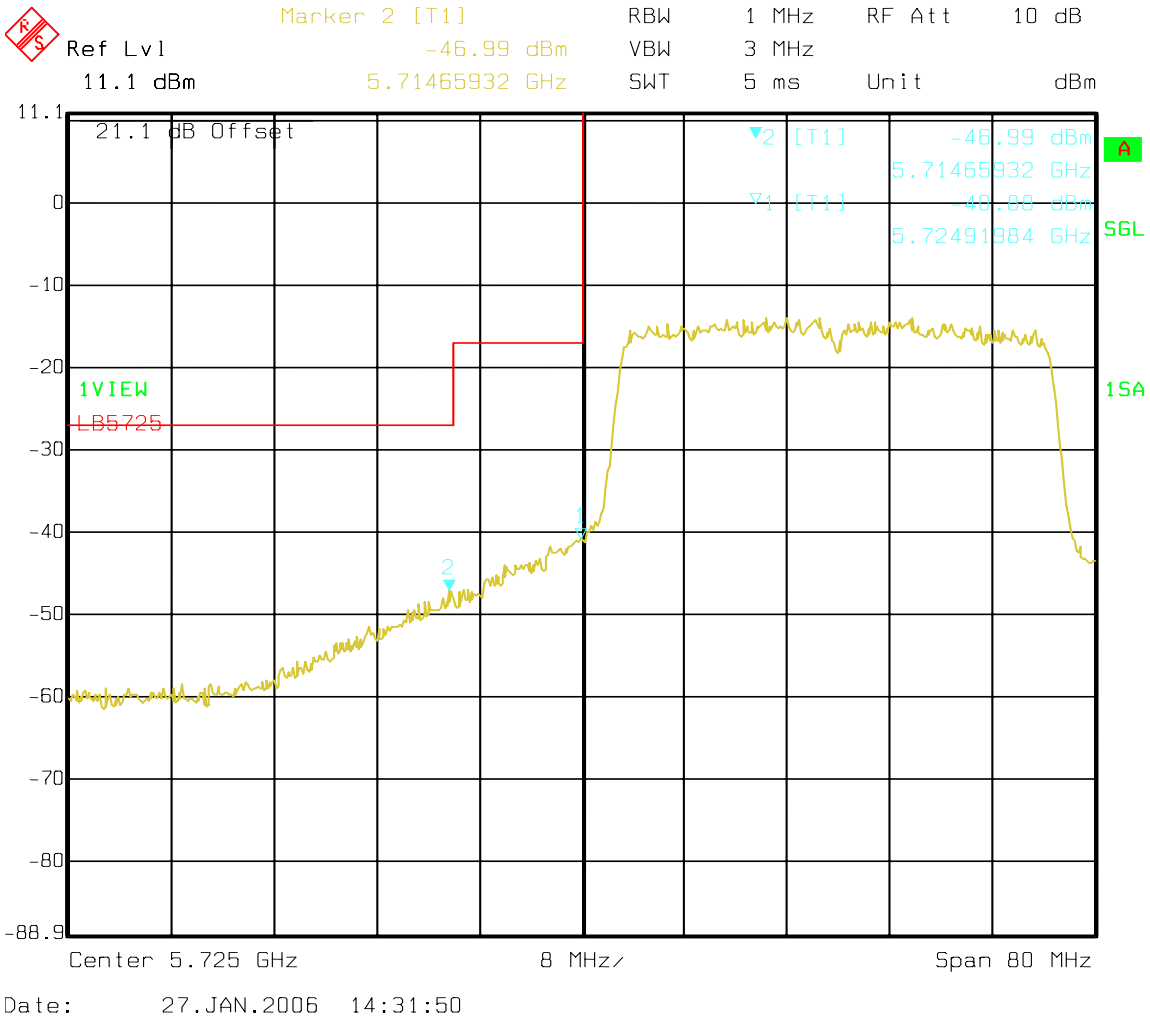
SF-D53N	5.8 GHz	Omni	5.5 dBi

No Harmonics were detected within 20db of the limit

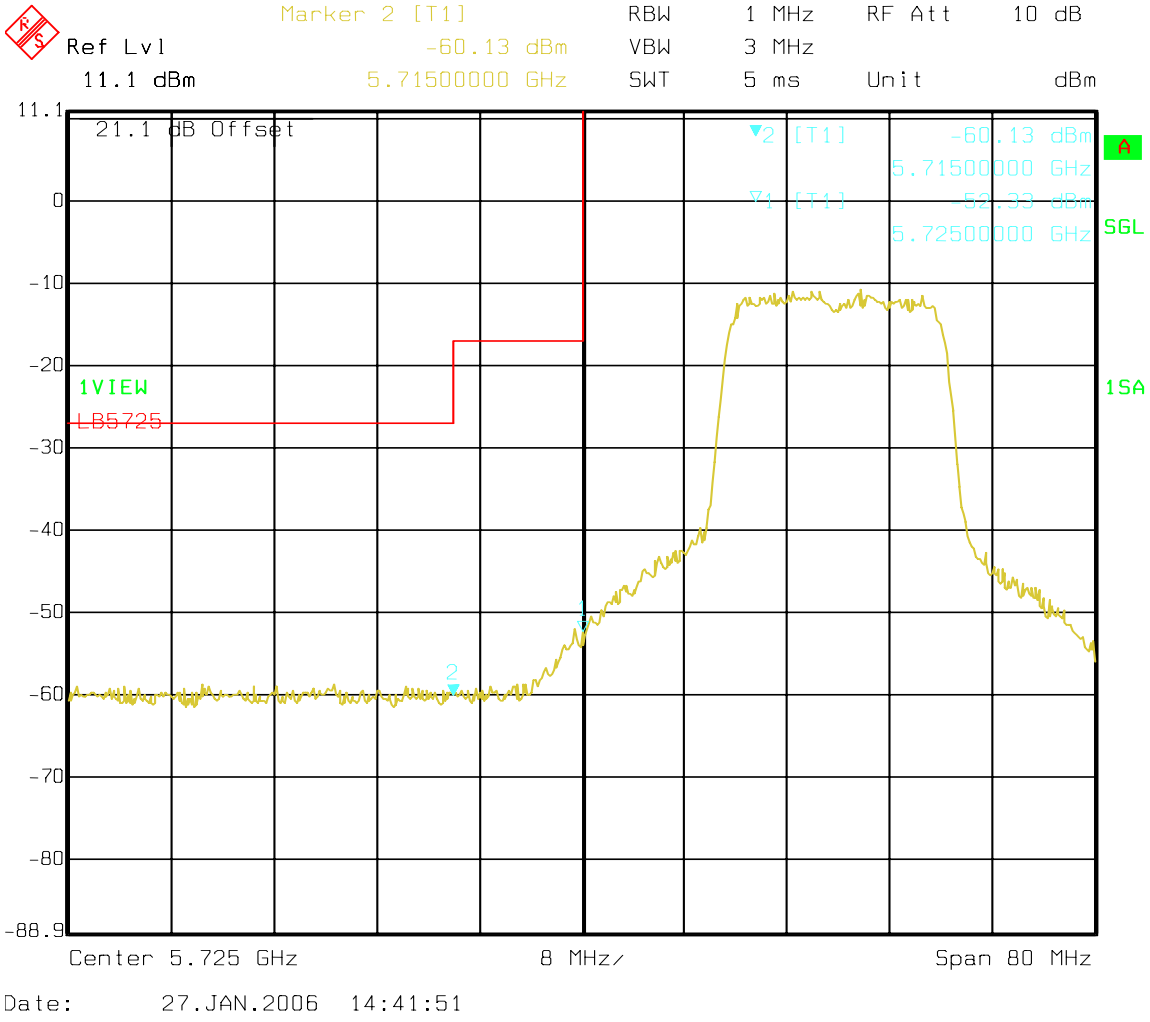
Max peak (ERIP) Upper/Lower Band edge 10MHz or less							
Freq	dBm	Mode	Freq. MHz	dBi	Corrected	Limit	margin
5725	-46.99	Turbo	5745	5.5	-41.49	-17	-24.49
5725	-52.33	Normal	5745	5.5	-46.83	-17	-29.83
5825	-37.89	Turbo	5805	5.5	-32.39	-17	-15.39
5825	-49.08	Normal	5805	5.5	-43.58	-17	-26.58

Max peak (ERIP) Upper/Lower Band edge 10MHz or greater							
Freq	dBm	Mode	Freq. MHz	dBi	Corrected	Limit	margin
5725	-48..88	Turbo	5745	5.5	-43.38	-27	-16.38
5725	-60.13	Normal	5745	5.5	-54.63	-27	-27.63
5825	-45.04	Turbo	5805	5.5	-39.54	-27	-12.54
5825	-59.03	Normal	5805	5.5	-53.53	-27	-26.53

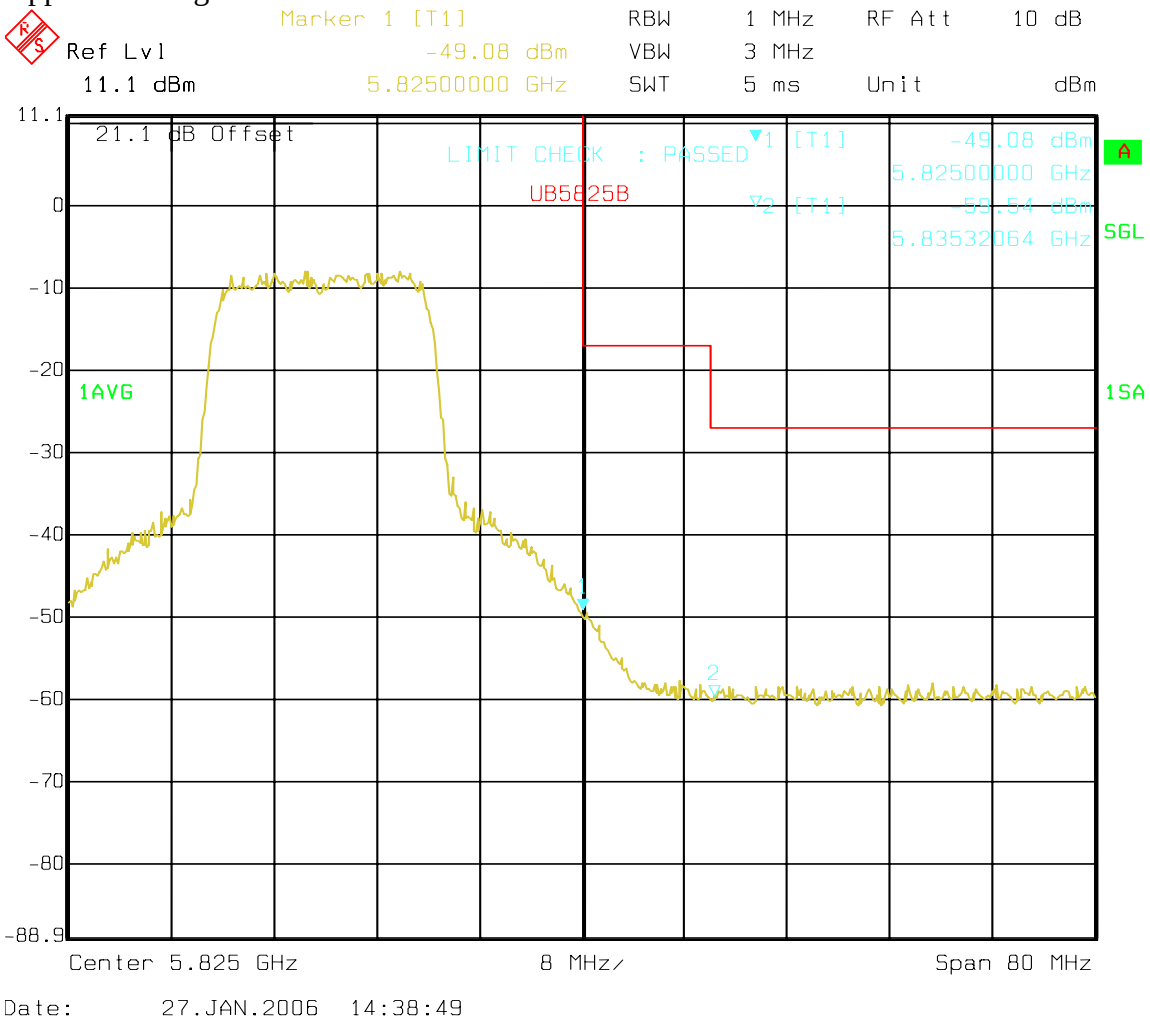
Lower band edge turbo mode TX 5745MHz



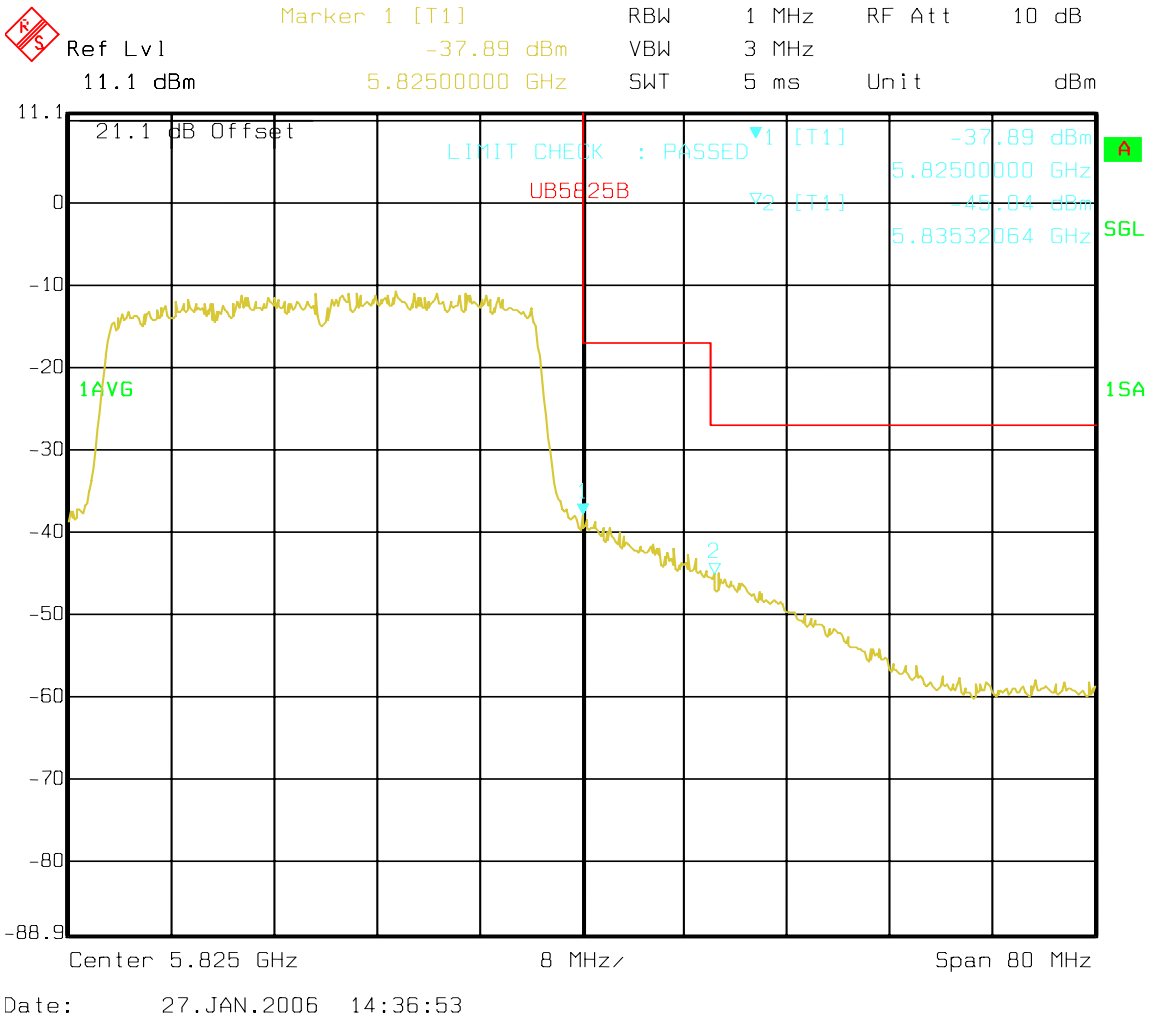
Lower band normal mode TX 5745MHz



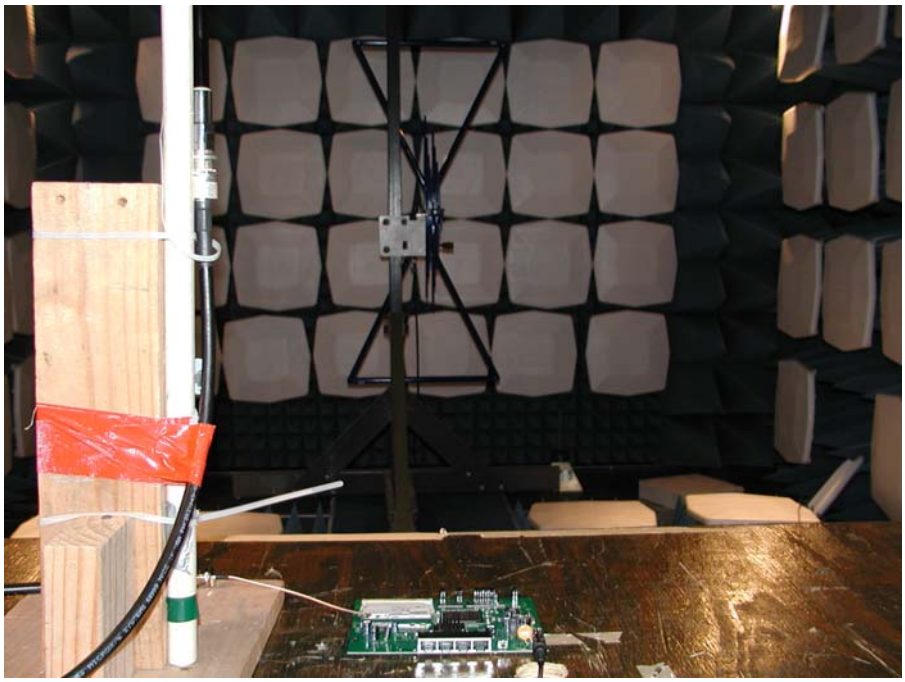
Upper band edge normal mode TX 5805MHz

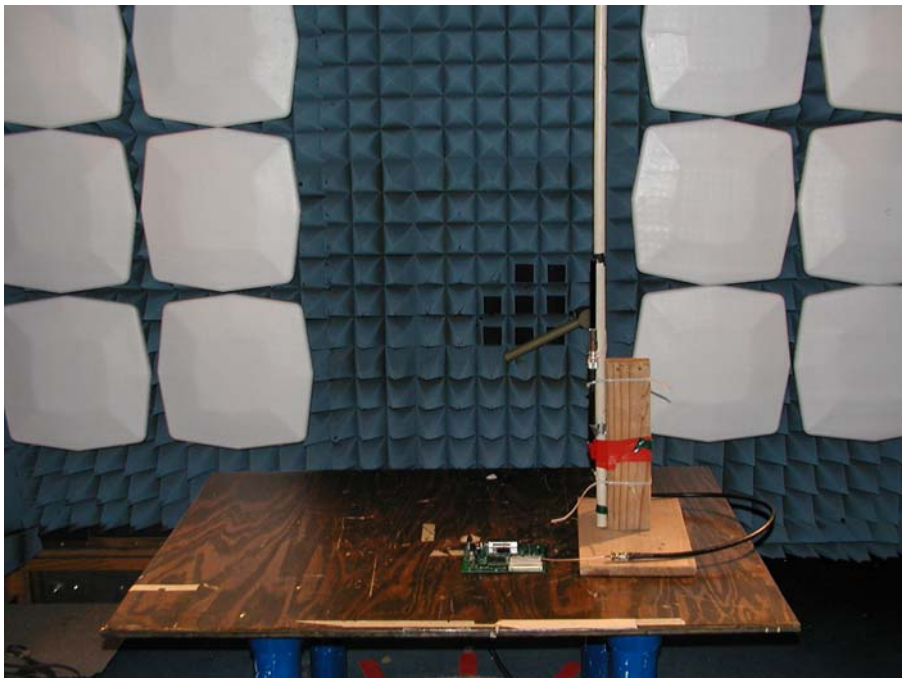


Upper band edge turbo mode TX 5805MHz



Test setup photos





2412, 2442, 2462MHz were tested
1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

C068-510330A	11b 2.4 GHz	Paddle	3 dBi – 2.4 GHz 4 dBi – 5 GHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	4883.750M	44.8	+1.0	+3.3 +33.4	+32.6	49.9	54.0	-4.1	Vert
2	7325.750M	42.0	+1.2	+4.0 +35.8	+32.3	50.7	54.0	-3.3	Vert
3	4823.750M	42.5	+1.0	+3.2 +33.2	+32.5	47.4	54.0	-6.6	Vert
4	7235.750M	40.3	+1.2	+3.9 +35.8	+32.2	49.0	54.0	-5.0	Vert
5	4923.750M	42.8	+1.0	+3.3 +33.5	+32.6	48.0	54.0	-6.0	Vert
6	7387.000M	43.8	+1.2	+4.0 +35.9	+32.4	52.5	54.0	-1.5	Vert
7	2483.500M	63.5	+0.8	+2.3 +29.0	+22.8	72.8	74.0	-1.2	Vert
8	2483.500M Ave	42.3	+0.8	+2.3 +29.0	+22.8	51.6	54.0	-2.4	Vert
9	2485.000M	50.8	+0.8	+2.3 +29.0	+22.8	60.1	74.0	-13.9	Horiz
10	2484.250M Ave	38.5	+0.8	+2.3 +29.0	+22.8	47.8	54.0	-6.2	Horiz
11	4924.750M	42.8	+1.0	+3.3 +33.5	+32.6	48.0	54.0	-6.0	Horiz
12	7386.750M	40.0	+1.2	+4.0 +35.9	+32.4	48.7	54.0	-5.3	Horiz
13	4884.750M	42.0	+1.0	+3.3 +33.4	+32.6	47.1	54.0	-6.9	Horiz
14	7326.750M	39.7	+1.2	+4.0 +35.8	+32.3	48.4	54.0	-5.6	Horiz
15	4824.750M	42.3	+1.0	+3.2 +33.2	+32.5	47.2	54.0	-6.8	Horiz
16	7236.750M	40.2	+1.2	+3.9 +35.8	+32.2	48.9	54.0	-5.1	Horiz

1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

2412, 2442, 2462MHz were tested

C068-510330A	11g 2.4 GHz	Paddle	3 dBi – 2.4 GHz 4 dBi – 5 GHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	4824.750M	42.0	+1.0	+3.2 +33.2	+32.5	46.9	54.0	-7.1	Horiz
2	7236.750M	39.2	+1.2	+3.9 +35.8	+32.2	47.9	54.0	-6.1	Horiz
3	4884.750M	42.5	+1.0	+3.3 +33.4	+32.6	47.6	54.0	-6.4	Horiz
4	7326.750M	40.5	+1.2	+4.0 +35.8	+32.3	49.2	54.0	-4.8	Horiz
5	4924.750M	42.7	+1.0	+3.3 +33.5	+32.6	47.9	54.0	-6.1	Horiz
6	7386.750M	41.0	+1.2	+4.0 +35.9	+32.4	49.7	54.0	-4.3	Horiz
7	2483.500M	59.2	+0.8	+2.3 +29.0	+22.8	68.5	74.0	-5.5	Horiz
8	2483.500M Ave	40.0	+0.8	+2.3 +29.0	+22.8	49.3	54.0	-4.7	Horiz
9	2483.500M	62.2	+0.8	+2.3 +29.0	+22.8	71.5	74.0	-2.5	Vert
10	2483.500M Ave	43.7	+0.8	+2.3 +29.0	+22.8	53.0	54.0	-1.0	Vert
11	4924.000M	43.7	+1.0	+3.3 +33.5	+32.6	48.9	54.0	-5.1	Vert
12	7386.000M	40.8	+1.2	+4.0 +35.9	+32.4	49.5	54.0	-4.5	Vert
13	4884.000M	43.2	+1.0	+3.3 +33.4	+32.6	48.3	54.0	-5.7	Vert
14	7326.000M	41.2	+1.2	+4.0 +35.8	+32.3	49.9	54.0	-4.1	Vert
15	4824.000M	42.3	+1.0	+3.2 +33.2	+32.5	47.2	54.0	-6.8	Vert
16	7236.000M	39.5	+1.2	+3.9 +35.8	+32.2	48.2	54.0	-5.8	Vert

1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

5180 – 5240 MHz were tested

C068-510330A	5.1 GHz	Paddle	3 dBi – 2.4 GHz 4 dBi – 5 GHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5150.000M	59.2	+1.1	+3.4 +33.7	+32.2	65.2	74.0	-8.8	Vert
2	5150.000M Ave	41.2	+1.1	+3.4 +33.7	+32.2	47.2	54.0	-6.8	Vert
15	5150.000M	42.0	+1.1	+3.4 +33.7	+32.2	48.0	54.0	-6.0	Horiz

No Harmonics were detected within 20db of the limit

1MHz RBW and 1MHz VBW for peak and 10hz VBW for Average

5260 – 5320 MHz

C068-510330A	5.3 GHz	Paddle	3 dBi – 2.4 GHz 4 dBi – 5 GHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5350.000M	42.3	+1.1	+3.4 +33.7	+32.0	48.5	74.0	-25.5	Horiz
2	5350.000M	55.7	+1.1	+3.4 +33.7	+32.0	61.9	74.0	-12.1	Vert
3	5350.000M Ave	35.3	+1.1	+3.4 +33.7	+32.0	41.5	54.0	-12.5	Vert

No Harmonics were detected within 20db of the limit

Turbo Mode 5210, 5290,5760, 5800 MHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable dB	Cable Horn dB	Pre-A dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5150.000M	37.8	+1.1	+3.4 +33.7	+32.2	43.8	54.0	-10.2	Vert
2	5150.000M	37.2	+1.1	+3.4 +33.7	+32.2	43.2	54.0	-10.8	Horiz
3	5350.000M	36.0	+1.1	+3.4 +33.7	+32.0	42.2	54.0	-11.8	Horiz
4	5350.000M	38.9	+1.1	+3.4 +33.7	+32.0	45.1	54.0	-8.9	Vert

No Harmonics were detected within 20db of the limit

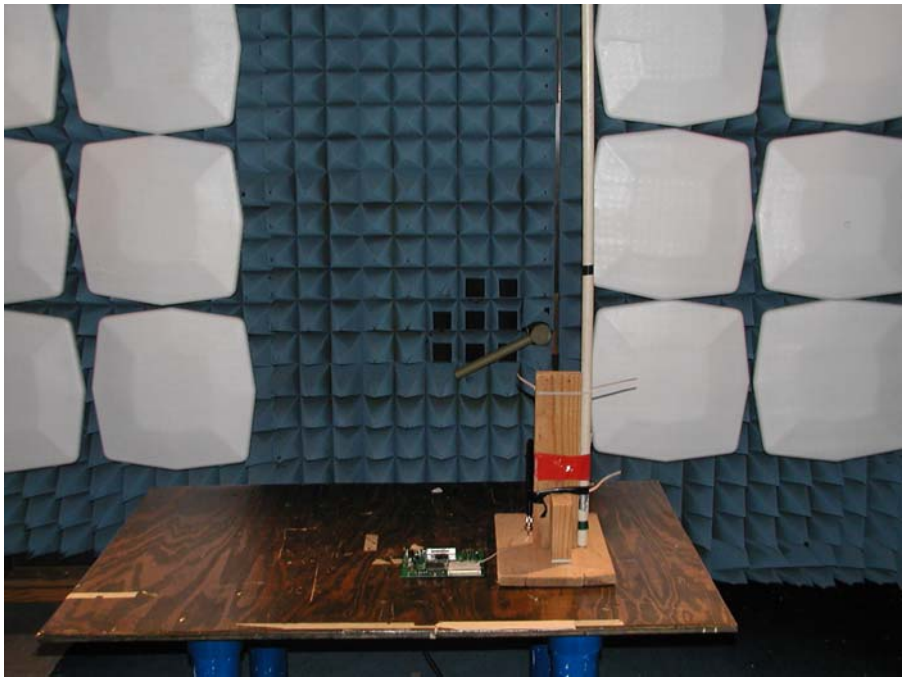
5745, 5785, 5825 MHz were tested

C068-510330A	5.8 GHz	Paddle	4 dBi – 5 GHz

Measurement Data: Reading listed by order taken. Test Distance: 3 Meters

No Harmonics were detected within 20db of the limit

Test setup photos



Section 4. Test Equipment List

Nemko ID	Description	Manufacturer / Model Number	Serial Number	Calibration Date	Calibration Due
1484	Cable 2.0-18.0 Ghz	Storm / PR90-010-072	N/A	08/26/05	08/26/06
1485	Cable 2.0-18.0 Ghz	Storm / PR90-010-216	N/A	08/02/05	08/26/06
993	Horn antenna	A.H. Systems / SAS-200/571	XXX	08/04/05	08/04/07
1016	Pre-Amp	HEWLETT PACKARD / 8449A	2749A00159	11/12/05	11/12/06
791	PREAMP, 25dB	ICC / LNA25	398	11/12/05	11/12/06
760	Antenna biconical	Electro Metrics / MFC-25	477	08/04/05	08/04/06
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS / SAS-200/510	556	08/04/05	08/04/06
1482	Band Pass Filter	K & L / 11SH10-4000/T12000-0/0	2	Cal B4 Use	N/A
1481	Microwave Highpass Filter	K & L / 3DH1-2000/T8000-0/0	4	Cal B4 Use	N/A
1464	Spectrum analyzer	Hewlett Packard / 8563E	3551A04428	01/14/05	01/15/07
1081	CABLE 2m	Astrolab / 32027-2-29094-72TC	N/A	08/26/05	08/26/06
1471	10 db Attenuator DC 18 Ghz	MCL Inc. / BW-S10W2 10db-2WDC	NONE	CBU	N/A

ANNEX A - TEST DETAILS

NAME OF TEST: Radiated Spurious Emissions PARA. NO.: 15.247(c)/15.407(e)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (μV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

ANNEX B - TEST DIAGRAMS

Test Site For Radiated Emissions